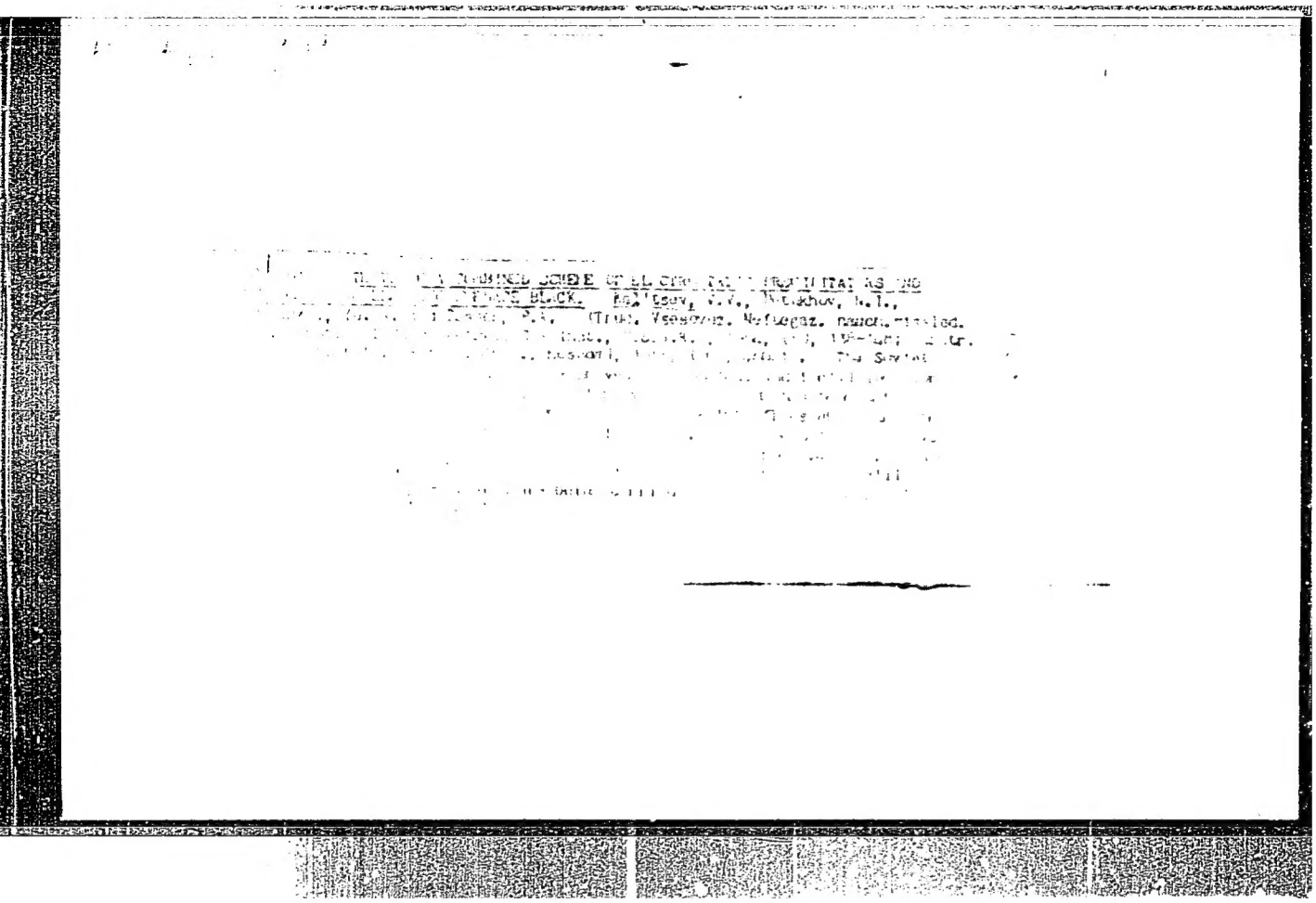
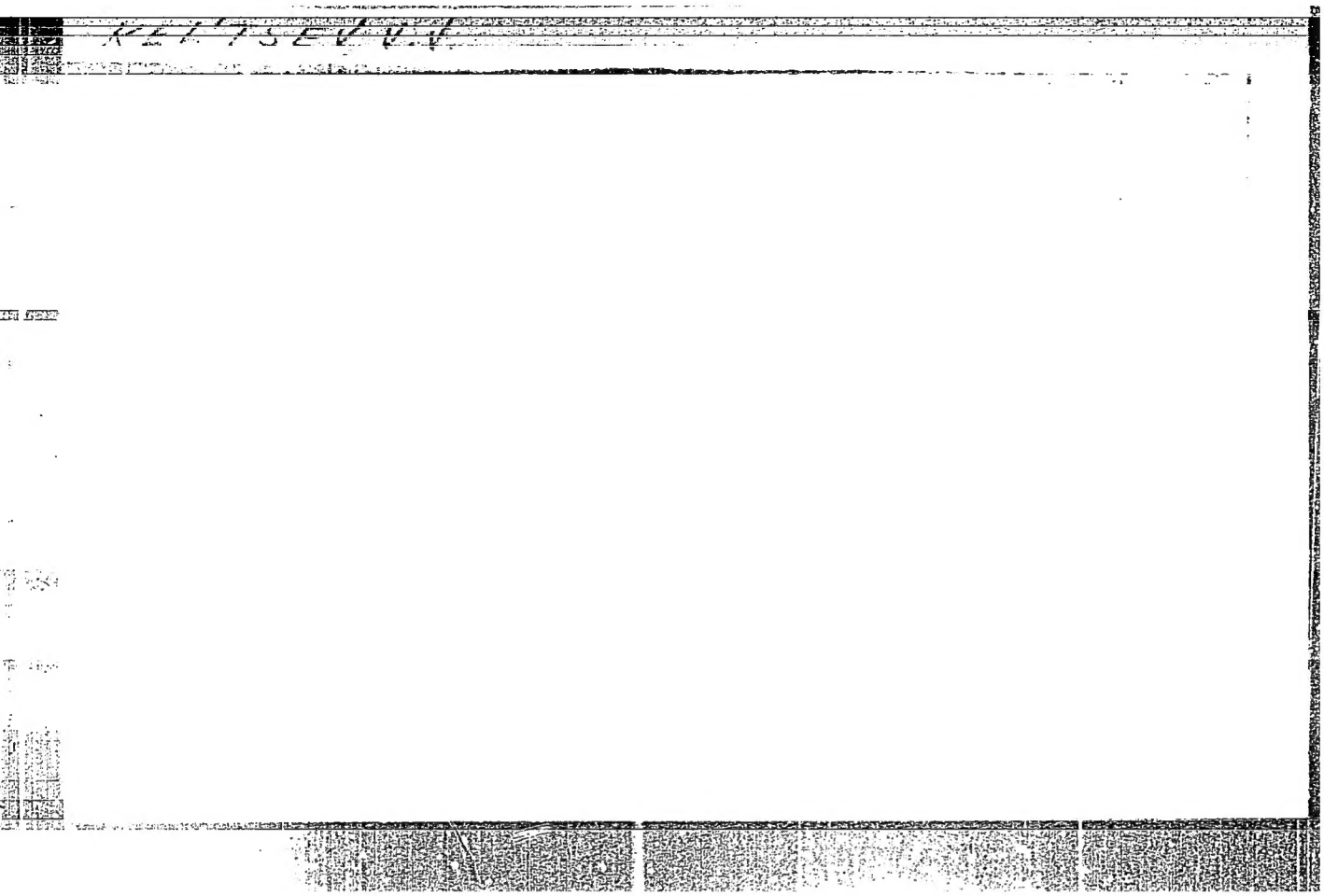


KAL'TSEV, V.V.

Method for testing tightness and the location of leaks in gas pipelines (from "Americ.Gas J.," 80 no.5 1954). Gaz.prom. no.8:35-36 Ag '56. (MLRA 10:7)
(Gas, Natural--Pipelines)



BENEVOLENSKAYA, G.V.; KEL'TSEV, V.V.

Studying the thermal decomposition of hydrocarbons on the surface of porous catalysts. Trudy VNIIGAZ no.3:116-129 '58.
(MIRA 11:8)

(Hydrocarbons) (Catalysts)

KEL'TSEV, V.V.; VINNIKOVA, N.I.

Investigating the catalytic dehydrogenation of propane with the introduction of additional hydrogen into the reaction zone. Gaz. prom. 4 no.5:36-41 My '59. (MIRA 12:7)
(Propane) (Catalysis)

BENEVOLENSKAYA, G.V.; KEL'TSEV, V.V.

Producing hydrogen by the thermal decomposition of natural gas on a porous contact surface in a batch-type pilot plant. Trudy VNIIGAZ no.6:88-97 '59. (MIRA 12:10)
(Hydrogen) (Gas, Natural)

BENEVOLENSKAYA, G.V.; KEL'TSEV, V.V.

Studying the rate of thermal decomposition of methane on the surface of porous catalysts. Trudy VNIIGAZ no.12:71-90 '61. (MIRA 15:1)
(Methane) (Catalysts)

GERASIMOV, V.G.; YEFIMOV, L.I., inzh.; KEL'TSEV, V.V., kand.tekhn.nauk; MAKAROV, K.M., inzh.; PODKOPAYEV, V.F., inzh.

Steam conversion of natural gas in a water gas producer. Masl.-zhir. prom. 27 no.9:31-34 S '61. (MIRA 14:11)

1. Moskovskiy gidrozavod (for Gerasimov). 2. Vsesoyuznyy nauchno-issledovatel'skiy institut prirodnogo gaza (for Yefimov, Kel'tsev, Makarov, Podkopayev).
(Gas, Natural) (Gas producers)

KEL'TSEV, V.V.; VINNIKOVA, N.I.

Catalytic dehydrogenation of propane and ethane. Trudy VNIIGAZ no.12:187-194 '61. (MIRA 15:1)
(Propane) (Ethanes) (Dehydrogenation)

SARKIS'YANTS, Gayk Arkad'yevich; BEN'YAMINOVICH, Osip Aleksandrovich; KEL'TSEV, Vladimir Vladimirovich; KEL'TSEV, Nikolay Vladimirovich; POLOZKOV, Vladimir Tikhonovich; KHALIF, Al'bert L'vovich; KHODANOVICH, Ivan Yefimovich; RAABEN, V.N., kand. tekhn. nauk, retsenzent; PLETNEV, K.N., inzh., red.; LEVINA, Ya.S., ved. red.; POLOSINA, A.S., tekhn. red.

[Processing and utilization of gas] Pererabotka i ispol'zovanie gaza. [By] G.A.Sarkis'iants i dr. Moskva, Gostoptekhizdat, 1962. 216 p. (MIRA 16:3)

1. Kafedra gaza Azerbaydzhanskogo ordena Trudovogo Krasnogo Znameni instituta nefti i khimii im. M.Azizbekova (for Raaben, Pletnev).
2. Zamestitel' direktor Vsesoyuznogo nauchno-issledovatel'skogo instituta gazovoy promyshlennosti (for Raaben).
(Gas, Natural)
(Gas industry—Equipment and supplies)

KEL'TSEV, V.V.; VINNIKOVA, N.I.; NIKOLAYEVSKAYA, G.V.

Investigating the thermal decomposition of methane on the surface of iron ore. Gaz. prom. 8 no.4:43-47 '63. (MIRA 17:10)

KEL'TSEV, V.V.

Recent developments in the production of hydrogen from natural gas. Gaz. delo no.12:33-36 '64. (MIRA 18:2)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut prirodnogo gaza.

BENEVOLENSKAYA, O.V.; KEL'TSEV, V.V.

Speed of the thermal decomposition of methane on the surface of iron ore. Gaz.prom. 10 no.2:32-36 '65.

(MIRA 18:12)

[redacted], O. P.

[redacted], O. P.: "The alkylation of the xylenol fraction of phenols using triethylene, in order to separate 3, 5-dimethyl phenol out of the mixture." Min Higher Education USSR. Moscow Order of Lenin Chemicotechnological Institute imeni D. I. Mendeleyev. Moscow, 1956. (Dissertation for the Degree of Candidate in Chemical Science.)

Knizhnaya letopis', No. 30, 1956. Moscow.

AUTHORS: Kel'tseva, O.B. and Moshkin, P.A. (V.N.I.I. NP).

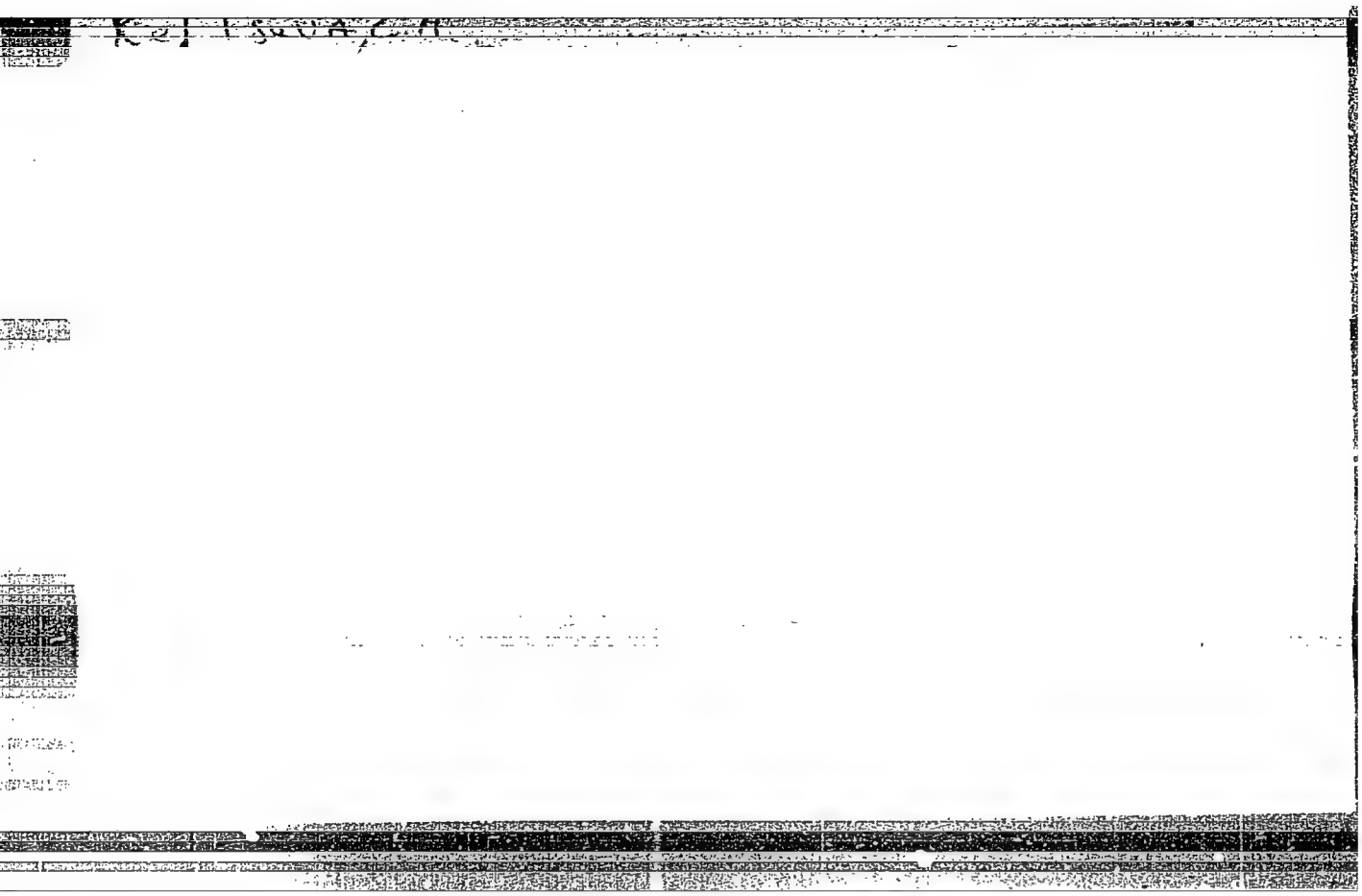
TITLE: Separation of 3,5-dimethylphenol using an alkylation method. (Vydeleniye 3,5-dimetilfenola po metodu alkilirovaniya).

PERIODICAL: "Khimiya i Tekhnologiya Topliva i Masel" (Chemistry and Technology of Fuels and Lubricants), 1957, No.2, pp.11 - 17. (U.S.S.R.)

ABSTRACT: Results of an investigation on the method of separating 3,5-dimethylphenol from xylenol fraction by alkylation with isobutylene are given. The method is based on the fact that 3,5-dimethylphenol unlike other isomers does not form tertiary butyl derivatives and can be separated from other alkylated xylenols by extraction with an NaOH solution in which alkylated products are not soluble. Experimental conditions of alkylation and results obtained are described in some detail (apparatus used Fig.1). Technical xylenol fractions from tars produced on high and low temperature carbonisation were used for experiments. The method can be used for the evaluation of xylenol fractions and together with the refractometric method (determination of refractive index of the alkaline extract of alkylated xylenols) can be used for the quantitative determination of 3,5-dimethylphenol in mixtures. 3 tables, 12 references, 7 of which are Russian.

Vses. nauch-issled. inst. po pererabotki nefti i gaza i polucheniyu iskusstvennogo zhidkogo topliva

Card 1/1



KEL'TSEVA, Z. A.

AUTHOR: Kel'tseva, Z.A. 101-58-2-4/8

TITLE: Determination of Oxides of Alkali Metals in Raw Material, Slurry and Clinker by the Flame Photometry Method (Opredeleniye okisey shchelochnykh metallov v syr'ye, shlame, klinkere metodom plamennoy fotometrii)

PERIODICAL: Tsement, 1958, Nr 2, pp 19-21 (USSR)

ABSTRACT: The author suggests the method of flame photometry for conducting minute analyses of any solution of chemical substances. This method is especially suitable for detecting alkali in silicates, being at the same time cheaper and faster than most ordinary chemical analyses. It is based on the application of an acetylene flame, into which the solution is fed by means of a pulverizer and burner (Figure 1) designed by D.N. Ivanov. The respective emissions of sodium and potassium hit specially prepared photoelectric cells which in turn are connected with an M-21 type mirror galvanometer. The intensity of radiation of the respective chemical solution determines the mirror's deflection angle which is compared with standard samples and entered in a diagram. Table 1 and 2 illustrate the dependability of the above method, showing analyses of the same samples con-

Card 1/2

Determination of Oxides of Alkali Metals in Raw Material, Slurry and Clinker by the Flame Photometry Method

ducted by the Pochvennyy institut AN SSSR (Soil Institute of the AS, USSR), Mosgeolnerudtrest and Vniiasbesttsement. There are 2 figures and 3 tables.

AVAILABLE: Library of Congress

Card 2/2 1. Photometry-Applications 2. Alkali metal oxides-Determination

KEL'TSEVA, Z.A., inzh.

Quantitative spectrum analysis of materials occurring in cement production. Trudy NIITSement no.17:20-26 '62. (MIRA 16:5)
(Silicates--Spectra)

MALININ, Yu.S., kand.tekhn.nauk; KEL'TSEVA, Z.A., inzh.; VOROB'YEV, V.A., inzh.

Method of studying the composition of the liquid phase of hardening cement. Trudy NIITSement no.17:39-44 '62. (MIRA 16:5)
(Cement--Analysis)

HIRSZFELD, L.; KELUS, A.

Serological structures of zygote in habitual abortion. Polski tygod. lek. 6 no.25-26:795-800 25 June 1951. (CIML 21:1)

1. Of the Research Center of the Pathology of Pregnancy of the Obstetric-Gynecological Clinic and of the Institute of Medical Microbiology, Wroclaw.

KELUS, A.

Factor Le and its meaning in the pathology of pregnancy. Polski tygod. lek. 6 nos.25-26:809-812 25 June 1951 (CIML 21:1)

1. Of the Research Center of the Pathology of Pregnancy and of the Institute of Medical Microbiology in Wroclaw.

FRANKOWSKA-STOCHOWA, K.; KELUS, A.; OSINSKA, M.

Paternity determination on the basis of blood groups. Polski tygod. lek. 6 nos.25-26:814-817 25 June 1951. (CIML 21:1)

1. Of the Institute of Medical Microbiology (Head — Prof. L. Hirszfeld, M.D.), of Wroclaw Medical Academy.

KELUS, A.

Methods of blood groups determination used in obstetric pathology. Postepy hig. med. doswiadcz., Warsz. 5:229-254 1952. (CLML 23:2)

1. Of Wroclaw Research Center of the Pathology of Pregnancy.

HIRSZFELD, L.; KELUS, A.

Serological studies on zygote in abortion. Med. dosw. mikrob., Warsz. 4 no. 3:339-340 1952. (CIML 23:3)

1. Summary of work progress presented at 11th Congress of Polish Microbiologists held in Krakow May 1951. 2. Wroclaw.

KELUS, A.

L[illegible] factor and its role in pregnancy. Med. dosw. mikrob., Warsz. 4 no. 3:341 1952. (CLML 23:3)

1. Summary of work progress presented at 11th Congress of Polish Microbiologists held in Krakow May 1951. 2. Wroclaw.

OSINSKA, M.;STOCHOWA, K.;KELUS, A.

Applications of new factors in determination of paternity. Med. dosw. mikrob., Warsz. 4 no. 3:343 1952. (CLML 23:3)

1. Summary of work progress presented at 11th Congress of Polish Microbiologists held in Krakow May 1951. 2. Wroclaw.

KELUS, A.; DUBISKI, S.; SZUSZKOWSKI, R.

Seroanthropological studies in Poland. Polski tygod. lek. 7 no.51-52:1763-1765 29 Dec 1952. (CIML 24:2)

1. Of the Institute of Microbiology (Director--Prof. L. Hirszfeld, M.D.) of Wroclaw Medical Academy.

KELUS, A.

Kell-Cellano blood groups. Polski tygod. lek. 8 no.11:426 16 Mar 1953. (CIML 24:5)

1. Of the Institute of Microbiology (Head--Prof. L. Hirszfeld, M.D.) of Wroclaw Medical Academy. 2. Preliminary communication.

POLAND/Human and Animal Physiology (Normal and Pathological). T-3
Blood. General Problems.

Abs Jour : Ref Zhur - Biol., No 16, 1958, 74598

Author : Kelus, Andrzej; Konieczna-Marczynska, Barbara; Skowron-Cendrzak, Anna

Inst :

Title : Hematological Investigations in White Mice During Parabiosis and after Splenectomy.

Orig Pub : Folia biol. (Polska), 1957, 5, No 3, 99-115.

Abstract : Tests were conducted on 90 pairs of parabiotically joined mice (♂ with ♀) from various litters which survived in parabiosis (P) no less than 10 days. The spleen (S) of the right parabiont was removed before P. Death in the first weeks of P reached 50%. Duration of life in P on the average equaled 2 weeks and in individual cases exceeded 5 months. Disharmony set in more often on the 10-15th day. Anemia appeared usually only in one partner,

Card 1/2

KILUS, A.

Cerebral antigens of some vertebrates. p. 291.

SO: Monthly List of East European Accessions (EEAL) LC, Vol. 6, no. 7, July 1957. Uncl.

KELUS J.

PTA

1452 663 631

Just J., Kelus J. **Natural and Synthetic Substances for the Elimination of Active Carbon Dioxide from Water.**

„Naturalne i sztuczne masy do usuwania z wody agresywnego dwutlenku węgla". Gaz, Woda i Technika Sanitarna. No 10, 195?. pp. 289—293, 1 fig., 6 tabs.

There are, in addition to the H_2O agent, a number of other substances present in natural waters which may also react on materials in contact with the water. The technique of their effect can be expressed by means of an equation of chemical or electro-chemical reactions which bring about the wearing away of any particular material i.e. corrosion. Factors influencing the corrosive properties of water. Determination of the corrosive features of water with reference to concrete and iron. Substances used for the elimination of carbon dioxide from water („Magno" compound, marble from the district of Kielce, white marble, dolomite). Method for identifying changes occurring in water under influences of these materials. Test results.

calcination of a dolomite: (2) gray Polish marble (5.5 mm

KELUS, J.

"Deferrization of Water." p. 51 (GAZ, WODA I TECHNIKA SANITARNA, Vol 27, No. 2, Feb. 1953) Warszawa

SO: Monthly List of East European Accessions, Library of Congress, Vol. 2, No. 10, October 1953. Unclassified.

KELUS, J.

(GAZ, WODA I TECHNIKA SANITARNA, Vol. 28, No. 1. Jan. 1954, Warsaw, Poland)
"Problem of removing phenols from industrial waste." p. 17

SO: MONTHLY LIST OF EAST EUROPEAN ACCESSIONS, L.C., Vol. 3, No. 4, APRIL 1954

4243

543.31 543.33

Hermanowicz W., Kelus J. Methods of Technological Study over the Elimination of Ferro-Compounds from Water.

„Metodyka badań technologicznych nad odżelazialnością wody". Gaz, Woda i Technika Sanitarna No 3, 1955, pp 70-74 3 figs, 3 tabs

With a view to standardising methods of removing iron from water, the authors conducted a number of relevant laboratory experiments. These concerned: 1) elimination of ferro-compounds from water by paper and sand filtration methods, 2) change of the pH of the water by individual or repeated aeration 3) removal of ferro-compounds from water by adding a coagulant, 4) precipitation of hydrated oxides of iron by liming (change of pH) and aeration The results obtained enabled the development of a method in most instances wholly satisfactory of eliminating iron from water.

KELUS, JADWIGA

2

Chem

Systematic technological test of water purification from iron. Witold Hermanowicz (Zakład Hig. Komunalnej Państwowego Zakładu Hig., Warsaw) and Jadwiga Kelus. *Gaz, Woda i Tech. Sanit.* 29, 70–4(1955).—The tests are run on samples of 50–100 l. obtained for (*a*) surface waters, directly from the spot where the water is to be drawn for utilization, for (*b*) underground wells equipped with pumps, by pumping for 10 min., and then taking the sample with a rubber hose inserted deep into the outlet pipe, and for (*c*) installations with a const. water flow, with a hose immersed in the outflowing stream without air penetration into it. The water is passed through a sand filter prepd. in a glass tube, and iron is detd. colorimetrically in the filtered portion. A rapid paper filter may be used instead of the sand filter, but the test result will depend upon its quality. Six to 8 l. of the sample is passed twice through an aerator consisting of two cylindrical vessels 200 mm. high and having 200 holes 1 mm. in diam. uniformly distributed in their bottoms. The aerated sample is allowed to stand for 1 hr. and then filtered through sand. Three-l. samples are treated with increasing amounts of 0.1% $Ca(OH)_2$ soln., and are then aerated and filtered. For coagulation, samples of 1 l. are treated with increasing amounts of a soln. contg. 10 mg. of $Al_2(SO_4)_3$ per ml. and then mechanically stirred, rapidly for the first min., and at 50 r.p.m. for 15 min. After 1 hr. they are filtered through rapid filters, and the first portions of the filtrate are discarded. For coagulation with alkalization, the test is run as under above but with prior addn. to the samples of a fixed amt. of CaO, to obtain proper rate of coagulation and size of ppt. Henry W. Lawendel

KELUS, J.

Artificial increase of precipitation. p.122

Vol. 29, no. 12, Dec. 1955
GAZ, WODA I TECHNIKA SANITARNA
Warszawa

Source: East European Accessions List (EEAL), LC, Vol. 5, no. 3, March 1956

POLAND / Chemical Technology. Chemical Products. H
Water Treating. Sewer Waters.

Abs Jour: Ref Zhur-Khimiya, 1958, No 20, 67914.

Author : Kelus J.
Inst : Not given.
Title : Synthetic Detergents and Their Effects on Treating of Sewer Waters.

Orig Pub: Gaz., woda, tech. sanit., 1956, 30, No 11, 402-404.

Abstract: Bibliographical review containing 14 names. No abstract.

Card 1/1

POLAND / Chemical Technology. Chemical Products and Their Application. Water Treatment. Sewage. H-5

Abs Jour: Ref Zhur-Khimiya, No 1, 1959, 1702.

Author : Hermanowicz, W., Kelus, J.
Inst : Not given.
Title : Removal of Iron From Water by the Cationite Escarbo.

Orig Pub: Roczn. Panstw. zakl hig., 1957, 8, No 6, 575-588.

Abstract: It was established that the cationite Escarbo in the Ca-form adsorbs Fe^{2+} ions and can be utilized in the removal of iron from water without decreasing its hardness. -- N. Bubbotina.

Card 1/1

HERMANOWICZ, Witold; KELUS, Jadwiga; SIKORSKA, Celina

The problem of manganese in drinking water. Roczn panstw zakl hig 14 no.3:213-219 '63.

1. Department of Municipal Hygiene, State Institute of Hygiene, Warsaw.

KELUS, Jadwiga, dr

Carcinogenic substances in water. Gaz woda techn sanit 37 no.2: 61-63 F '63.

SIKORSKA, Celina; KELUS, Jadwiga

Studies on the radioactive strontium content in the waters of supply systems in Poland. Gaz woda techn sanit 37 no.7:209-213 Jl '64.

1. Department of Municipal Hygiene, State Institute of Hygiene, Warsaw.

HERMANOWICZ, W.; SIKOROWSKA, C.; KELUS, Jadwiga

The Sr-90 and stable strontium content in certain natural waters of Greater Warsaw. Gaz woda techn sanit 38 no.2:47-52 F '64.

1. Department of Public Hygiene, State Institute of Hygiene, Warsaw.

KELUS, Jadwiga

Hygienic significance of condensed phosphates (polyphosphates) in preventing iron and manganese precipitation in water. Roczn. panstw. zakl. hig. 14 no.4:355-361 '65.

1. Z Zakladu Higieny Komunalnej Panstwowego Zakladu Higieny w Warszawie (Kierownik Zakladu: prof. dr. J. Just).

KELUS, O. G.

KELUS, O. G. "Pests and Diseases of Young Shelter Belts of the Kamenaia Steppe and Volga Districts," Itogi Nauchno-Issledovatel'skikh Rabot Vsesoiuznogo Instituta Zashchity Rastenii za 1935 Goda, 1936, pp. 192-196, 423.92 I5HI

So: Sira Si - 1953, 15 December 1953

KELVAN, S.

Category: Poland/General Biology. Evolution. B-7

Abs Jour: Referat Zh.-Biol., No 6, 25 March 1957, 21612

Author : Kelvan, S.
Inst : not given
Title : The quantum evolution theory of G.G. Simpson.

Orig Pub: Kosmos (Polska), 1956, A5, No 2, 121-136

Abstract: No abstract.

Card : 1/1

KELYARSKIY, Yevgeniy

Making models today and rockets tomorrow. IUn.tekh. 6 no.4:38-39 Ap '62. (MIRA 15:6)

1. Glavnyy redaktor zhurnala Ligi druzey soldat "Voprosy modelirovaniya".
(Poland—Models and modelmaking)

KELYCHI, ZIYA.

3-58-2-27/33

AUTHORS: Kelychi, Ziya, Dotsent, Rector of Tirana State University
Makarov, V.T., Professor, Doctor of Biological Sciences

TITLE: The University of People's Albania (Universitet narodnoy Albanii)

PERIODICAL: Vestnik Vysshey Shkoly, 1958, # 2, pp 81 - 82 (USSR)

ABSTRACT: After pointing out the recent cultural achievements of Albania, the article gives particulars on the Tirana State University which was opened on 1 September 1957.

The country's 5 institutes (pedagogical, economic, polytechnical, medical and scientific) served as a basis for the establishment of the Tirana University with its 6 faculties and 15 specialties.

The Historical-Philological Faculties training specialists in history, Albanian language and literature as well as the Russian language. Attached to the faculty is a Scientific-Research Institute on Albanian History, Language and Literature and a Museum of Archeology and Ethnography.

The Economic Faculty (for planning the national economy, economics of indutry, finances, statistics and recording, geography) is training specialists in economics and finance.

The Juridical Faculty consists of chairs of state theory and history and law, criminal law, civil law and international law.

Card 1/3

The University of People's Albania 3-58-2-27/33

One of the basic faculties is in natural sciences with its two departments: the physico-mathematical and bio-chemical. The faculty has a Museum of Natural Science.

The Engineering Faculty has 4 departments - electro-engineering, mechanical, construction and geological. Attached to it is a Museum of Geology.

The chairs of the Medical Faculty have well equipped clinics and laboratories.

The University has a library of over 300,000 national and foreign books, journals, etc. The present number of students is 1,600 in the day departments, 884 at the evening courses and 962 in correspondence. In 1957, the number of students admitted to the 1st course was 450. It is planned that this number will be increased to 830 in 1962. The number of instructors will also increase. At present, there are 220 instructors, including 25 holding scientific degrees, 30 scientific workers and 115 laboratory workers. The number of professors and instructors will be doubled within 5 years.

The chairs are working on the development of a number of problems of scientific and economic importance, in particular, the natural resources of Albania and their rational utilization, increase of machine productivity, construction, power

Card 2/3

The University of People's Albania

KELYMENOV, A.Ye.

New cleaning machine for station platforms. Zhel. dor. transp. 46 no.1:81 Ja '64. (MIRA 17:8)

1. Starshiy inzh. Glavnogo passazhirskogo upravleniya Ministerstva putey soobshcheniya.

KELYMENOV V.E.

YERMANOK, M.Z.; KELYMENOV, V.E.

Efficient technology for the production of rectangular aluminum tubes. Tsvet. met. 30 no.5:85-90 My '57. (MLRA 10:6)
(Aluminum) (Extrusion (Metalwork))

KELYUKH, I. P.

Rest nitrogen (RN) in cancer patients. T. L. Vakulenko, I. P. Kelyukh, and N. Ya. Sergeev. *Materialy po Bor'be Zlokachestvennymi Opukholyami* 1954, No. 4, 17-20. *Referat. Zhur. Khim., Biol. Khim.* 1955, No. 7049. – The RN is increased in the blood of cancer patients. Under normal conditions blood RN was 26.5 mg.%. In cancer patients it was 41.2 mg.%. Greatest deviations from the normal were observed in cancer of the lip, lowest in cancer of the stomach. Postoperatively (surgery, Ra or Röntgen-ray therapy) the blood RN first rises, then declines. B. S. Levine

MD

(2)

KEL'ZON, A.S.

Self-centering and balancing of a rigid rotor rotating in two elastic supports. Dokl.AN SSSR 110 no.1:31-33 S-O '56. (MLRA 9:11)

1. Leningradskoye vysshoye inzhenernoye morskoye uchilishche imeni admirala S.O.Makarova. Predstavleno akademikom V.I.Smirnovym.
(Balancing, Of machinery) (Gyroscope)

3
F/W

4928:

Kel'zon, A. S. On the motion of a point on a pursuit curve. Bul. Inst. Politehn. Iaşi (N.S.) 3 (1957), 43–48. (Russian. English and Romanian summaries)

The author derives equation of motion of a point moving on a pursuit curve (i.e., a curve along which the velocity vector is continuously directed toward the moving target) for various ratios of the velocities in question. Certain results obtained here were obtained already in the past (by Bouquer, Cailler, Ficklin, etc.). An inverse problem is also treated, where the velocity vector is directed from the target along the line connecting the moving point and the target. The approach used is very elementary.

M. Z. v. Krzywoblocki (Urbana, Ill.)

GRIGOR'YEVA, O.V. and KEL'ZON, A.S.

"The Dynamics of Proportional Navigation." Notes of the Leningrad Higher Engineering Naval Academy im. admiral S.O. Makarov, Issue 5, 1957.

KELZON, A.S.

124-58-6-6289

Translation from: Referativnyy zhurnal, Mekhanika, 1958, Nr 6, p 4 (USSR)

AUTHOR: Kel'zon, A S

TITLE: An Equation for the Motion of a Point Along a Pursuit Curve at a Constant Angle of Lead (Uravneniye dvizheniya tochki po krivoy pogoni s postoyannym uglom uprezhdeniya)

PERIODICAL: Uch. zap. Leningr. vyssh. inzh. morsk. uch-shche, 1957, Nr 5, pp 13-24

ABSTRACT: A generalization is given of the classic line-of-pursuit problem for a case in which pursuit occurs at a constant angle of lead. A qualitative analysis is made of the trajectory in a moving system of coordinates linked to the pursued point. A determination is made of the time required by the pursuing point to hit its target.

Ye. N. Berezkin

1. Projectile trajectories--Mathematical analysis

Card 1/1

Kel'zon, A.S.

20-6-10/42

AUTHOR: Kel'zon, A. S.

TITLE: Homing as a Problem of Engineering Cybernetics (Samonavedeniye kak zadacha tekhnicheskoy kibernetiki)

PERIODICAL: Doklady AN SSSR, 1957, Vol. 116, Nr 6, pp. 933 - 936 (USSR)

ABSTRACT: First, reference is made to some pertinent preliminary works. The occurrence of modern high-speed calculating machines lead to the tendency to compute separately the similar disturbed trajectories of a projectile by taking no account of the investigation of the system of differential equations by variation. With such a process of selection of the principal parameters of the system of automatic control nothing can be said about the stability of motion in the last interval. Tsyan' Syue-shen' (reference 1) investigated the stabilitzation of the range of a ballistic rocket as problem of engineering cybernetics. Tsyan' Syue-shen' defines the selection of the system of automatic control of motion by utilizing a system of differential equations with variations, he starts from the conditions of reduction of failings to hit. The present elaborate study applies this principle for the analysis and synthesis of self-sighting of controllable projectiles. The dynamics of ideal motion: First the system of differential equations of the charge

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is given. An equation is also given for the uniform and rectilinear motion of the target. The solution of this system is the law for the angle of rotation of the rudder. The behavior of the rudder in the vicinity of the target is of great interest. The sole parameter which determines here the character of changing of the angle of rotation of the rudder is then the relation XX (speed of the target / speed of the projectile). The realizability of pursuit can only be determined by investigation of the angle of rotation of the rudder, and not by the investigation of angular velocity of the line of sight, the normal acceleration, overcharge, or the radius of circulation. The dynamics of real motion: The solution of the problem of the ideal motion of charge furnishes a system of differential equations with variations. Starting from this system, the parameters of the system of automatic control are chosen which allow a stable sighting (aiming) of the projectile on the target. In reality the charge has a self-aim head the axis of which is continuously directed to the target. Hereby the angle $\Delta\psi$ changes continuously betweenthe direction towards the target, and the vector of velocity of the gravity-center of the projectile. A formula for the angle of rotation (gimballing) of the rudder at real motion is given. The solution of the complete differential equation taking account of the initial conditions is written down, it

Card 2/3

PRESENTED: May 10, 1957, by V. I. Smirnov, Academician

SUBMITTED: May 8, 1957

BAT', Moisey Iosifovich; KEL'ZON, Anatoliy Saulovich; SOROKOV, Solomon Abramovich; LEVANTOVSKIY, V.I., red.; [illegible], S.N., tekhn.red.

[Collection of problems in theoretical mechanics; for technical schools] Sbornik zadach po teoreticheskoi mekhanike; dlia tekhnikumov. Pod red. A.S.Kel'zona. Moskva, Gos.izd-vo fiziko-matem.lit-ry, 1958. 320 p. (MIRA 12:2)
(Mechanics--Problems, exercises, etc.)

KEL'ZON, A.S.

"A New Problem from the Area of Navigation." Works of LONIOVT, Issue 4, 1958/

AUTHOR: Kel'zon, A.S. and Grigor'yeva, O.V. (Leningrad) SOV/20-121-3-10/47

TITLE: The Proportional Navigation as a Problem of Cybernetics (Proportsional'naya navigatsiya kak problema kibernetiki)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 121, Nr 3, pp 432-435 (USSR)

ABSTRACT: Starting from the papers of Newell [Ref 1] and Spitz [Ref 2] who investigated the kinematics of guided missiles, the authors consider the dynamics of guided missiles under proportional navigation and the suitable choice of a control of motion which would guarantee a stable tending of the object to the target. The consideration of the dynamic equations for the considered motion admits to explain partially the apparent discrepancies (the necessity of non-hitting) in the papers of Locke [Ref 6] and Adler [Ref 9].
There are 10 references, 3 of which are Soviet, and 7 American.

ASSOCIATION: Leningradskoye vysshoye inzhenernoye morskoye uchilishche imeni admirala Makarova (Leningrad Higher School of Naval Engineering imeni Admiral Makarov)

PRESENTED: March 27, 1958, by V.I. Smirnov, Academician

Card 1/2

28(2); 13(2); 29(1) PHASE I BOOK EXPLOITATION SOV/2707

Kel'zon, Anatoliy Saulovich

Dinamicheskiye zadachi kibernetiki (Dynamics Problems in Cybernetics) Leningrad, Sudpromgiz, 1959. 295 p. 21,000 copies printed.

Scientific Ed.: V. L. Kan; Ed.: I. I. Polyakov; Tech. Ed.: N. V. Erastova.

PURPOSE: This book is intended for engineers, scientific workers, and students at higher technical institutions of engineering, physics, and mathematics who are interested in cybernetics and its application to the investigation of dynamics problems in the automatic control of ballistic missiles.

COVERAGE: The author, using examples from modern engineering, demonstrates the methods of cybernetics (defined as the science of construction of systems of mechanical and electric components for accomplishing stable target-directed operations) applied to investigations of missile flight. The selected dynamics problems

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concerning automatic control of missile flight are considered thoroughly enough to show the value of the cybernetic approach to such investigations. Special attention is given to the efficient use of modern analog computers in the investigation and construction of automatic control systems. The author thanks Academician V. I. Smirnov and Professor A. I. Lur'ye for their interest in this work. V. L. Kan, Professor P. I. Saidov, and Ya. M. Tseytlin provided comments leading to improvement of the book and M. V. Matygulina prepared the manuscript for publication. There are 97 references: 38 Soviet, 21 English, 19 French, 10 German, 2 Italian, and 7 translations into Russian.

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Dynamics Problems (Cont.) SOV/2707

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AVAILABLE: Library of Congress

IS/mmh
1-8-60

Card 11/11

SOV/179-59-3-7/45

AUTHORS: Kel'zon, A.S. and Mushina, N. I. (Leningrad)

TITLE: Determination of Vibrations of Fast Rotors with a Tensioned Spring (Issledovaniye vibratsiy bystrokhodnykh rotorov s uchetom natyaga pruzhiny)

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Mekhanika i mashinostroyeniye, 1959, Nr 3, pp 49-52 (USSR)

ABSTRACT: The type of rotor under discussion is illustrated in Fig 1 (Refs 1 and 2). The rotor itself 3 revolves in the footstep bearing 7 and in the collar bearing 11. Both are attached to the sleeve 2 which is shaped in the form of a sphere at its top. Vibrations produced in this system can be determined if the coordinates x, y, z are assumed to have their origin 0 in the centre of the sphere. The spring 9 is tightened to a certain initial tension N_1. The coordinates of the centre of gravity, which is situated above the point 0, are x_c, y_c, z_c. The distance from the centre of gravity to 0 is ℓ_2, that between 0 and a lower rest point A (x_1, y_1, z_1) is ℓ. The vibration of the rotor is defined

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by Eqs (1) and (2) or by Eq (3) for the constants Eq (4). The notations are as follows:

ω - a constant angular velocity,
A - moment of inertia in respect to the axis of symmetry,
B_c - moment of inertia for the rotor and sleeve in respect to the equatorial axis which passes through the point O,
Q - weight of the rotor and sleeve,
α - the angle between the horizon and the contact surface between the collar 5 and the cylinder 4,
N_2 - the horizontal component of the cylinder 4,
r - the distance between the rotor axis and the reaction point on the cylinder 4,
c_1 - coefficient of the spring rigidity,
c_2 - coefficient of the spring rigidity reduced to the horizontal axis,
ρ - displacement of the point A on the rotor.

If the complex variable $y + iz = \rho e^{i\varphi}$ is introduced, then from Eq (3) Eqs (5) are obtained, the second equation of which can be integrated as shown by Eq (6). The first

Determination of Vibrations of Fast Rotors with a Tensioned Spring

equation of Eq (5) can be determined as Eqs (8) and (9) if the expression (7) is substituted. Thus, it can be seen that ρ_{max} can be defined as Eq (10) for the moment t_1, Eq (11). The moment t_2 for $\rho = 0$ can be expressed by Eq (12). The relationship of ρ and φ can be shown as in Eq (13). The graph illustrating the variations of the amplitude and the phase of rotor vibrations (ρ and φ) in relation to the time is given in Fig 2. The coordinates of the point A in this case will be Eq (14) and the frequency of ρ ($0 \leqslant \rho \leqslant \rho_{max}$) will be Eq (15). The phase φ will have the frequency Eq (16) which does not depend on the initial conditions. The constrained vibrations of this system can be defined if a mass m is added at a distance e from the axis of symmetry and at a distance b from O. Then, the differential equations describing the motion will take the forms of Eqs (17) and (18), which can be solved, according to Ref (3), as Eqs (19) to (21). The critical angular velocity ω_* will be equal to Eq (22). Acknowledgments are made to

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Determination of Vibrations of Fast Rotors with a Tensioned Spring

A. I. Lur'ye and Yu. V. Dolgolenko for their advice. There are 2 figures and 5 references, 4 of which are Soviet and 1 German.

SUBMITTED: January 8, 1959

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3.3000

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S/020/60/130/06/012/059
B013/B007

AUTHORS: Kan, V. L., Kel'zon, A. S.

TITLE: The Stable and Unstable Trajectories of Proportional Navigation

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol 130, Nr 6, pp 1220 - 1223 (USSR)

ABSTRACT: The authors investigate the proportional navigation for arbitrary integral values of the navigation constant. The differential equations of the ideal motion of an axially symmetric object in the horizontal plane read: $mv\dot{\psi} = (T+c_L v^2)\alpha$; $I_z\ddot{\varphi} = -k_1(v)\beta - k_2(v)\dot{\varphi} + k_3(v)\alpha$; $\varphi = \eta - 90^\circ + \alpha - \gamma$; $\psi + \gamma = \eta$; $\psi = b\dot{\eta}$; $\dot{a} = v_s \cos\eta - v\cos\gamma$; $a\dot{\eta} = v\sin\gamma - v_s \sin\eta$. From the system of the last four equations one obtains a closed solution for arbitrary integral values of the navigation constant. This system is then represented in the form

$$\dot{a} = v_s[\cos\eta - p\cos(b-1)(\eta-\varepsilon_0)] = v_s F(\eta);$$

$$a\dot{\eta} = -v_s[\sin\eta + p\sin(b-1)(\eta-\varepsilon_0)] = -v_s f(\eta),$$

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The Stable and Unstable Trajectories of Proportional Navigation

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where $p = v/v_s$; $\varepsilon_0 = (b\eta_0 - \psi_0)/(b - 1)$ hold. The subscript o denotes the initial values of the variables. By integration of the latter system of equations for b = 4 one obtains the trajectory equation

$$\frac{a}{a_0}\left[\frac{p \sin 3(\eta-\varepsilon_0)+\sin\eta}{p \sin 3(\eta_0-\varepsilon_0)+\sin\eta_0}\right]^{1/3}\prod_{i=1}^{3}\left|\frac{tg(\eta-\varepsilon_0)-tg(\eta_i-\varepsilon_0)}{tg(\eta_0-\varepsilon_0)-tg(\eta_i-\varepsilon_0)}\right|^{-\frac{4}{3}A_i\frac{\sin\varepsilon_0}{p-\cos\varepsilon_0}},$$

where B_i, in turn, is again a rather complex function. This trajectory equation may be simplified for special values of ε_0. The exact solution for various integral values of the navigation constant may be divided into two cases: odd b and even b. A formula is written down also for the curvature of the trajectory. The authors then investigate the behavior of the object near the target for the case in which the object moves more rapidly than the target. In such a case the stable and unstable roots alternate. To the stable and unstable roots there correspond an approach and a withdrawal from the target,

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The Stable and Unstable Trajectories of Proportional Navigation

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respectively. The authors then deal with the motion of the object near the stable roots. In the corresponding expansions into series only the first terms are in each case retained. With $b \geqslant 2n$ an interception (perekhvat) is possible with an arbitrary ratio of the velocities p, arbitrary initial conditions, and from an arbitrary direction. With $b < 2n$, the limit of stability may be determined for the corresponding variables. In a similar manner also a real motion may be investigated, and it is further possible to select the amplification coefficients in the system of automatic control of the motion. There are 4 figures and 4 references, 2 of which are Soviet.

ASSOCIATION: Leningradskoye vyasheye inzhenernoye morskoye uchilishche im. admirala Makarova (Leningrad Higher School of Naval Engineers imeni Admiral Makarov)

PRESENTED: July 9, 1959, by V. I. Smirnov, Academician
SUBMITTED: July 7, 1959

Card 3/3

BAT', Moisey Iosifovich; DZHANELIDZE, Georgiy Yustinovich; KEL'ZON, Anatoliy Samuilovich; MARKUZON, I.A., red.; AKHLAMOV, S.N., tekhn. red.

[Theoretical mechanics in exercises and problems] Teoreticheskaia mekhanika v primerakh i zadachakh. Moskva, Gos. izd-vo fiziko-matem. lit-ry. Vol.1. [Statics and kinematics] Statika i kinematika. Pod red. G.IU.Dzhanelidze. 1961. 472 p. (MIRA 14:8)
(Statics) (Kinematics)

BAT', Moisey Iosifovich; DZHANELIDZE, Georgiy Yustinovich; KEL'ZON, Anatoliy Saulovich; MARKUZON, I.A., red.; AKHLAMOV, S.N., tekhn. red.

[Analytic mechanics in exercises and problems] Teoreticheskaia mekhanika v primerakh i zadachakh. Pod red. G.IU.Dzhanelidze. Moskva, Gos. izd-vo fiziko-matem. lit-ry. Vol.2. [Dynamics] Dinamika, 1961. 616 p. (MIRA 15:1)
(Dynamics—Problems, exercises, etc.)

KEL'ZON, A.S. (Leningrad); MUSHINA, N.I. (Leningrad)

Vibration of a self-centering centrifuge. Izv.AN SSSR.Otd.tekh.nauk. Mekh.i mashinostr. no.3:98-101 My-Je '61. (MIRA 14:6)
(Centrifuges—Vibration)

S/147/61/000/004/003/021
E031/E184

10.1240

AUTHORS: Grigor'yeva, O.V., and Kel'zon, A.S.

TITLE: The calculation of control inertia in certain guidance problems

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Aviatsionnaya tekhnika, no.4, 1961, 22-29

TEXT: It has been shown that all estimates of manoeuvrability based on the value of the normal acceleration of the centre of inertia are inadequate. The conditions of stable missile guidance with consideration of the inertia of the controlling airfoil are discussed for the following cases of homing: 1) with a zero lead angle (pure pursuit course); 2) with a constant lead angle (deviated pursuit course); and 3) with the use of the proportional navigation course (approach). The limit values, in pursuit courses, of the velocity and acceleration of the control-flap declination in the final stage of approach are determined from given formulae for certain values of $k = v_s/v$ (v_s = speed of the target, v = speed of missile inertia centre). In the proportional navigation course

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The calculations of control inertia.. S/147/61/000/004/003/021
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equations of motion are given for the navigational correction A = 2; the solution shows the relationship between the angle of control-flap declination and the lead angle. This relationship ensures that the controlled object will follow the trajectory exactly. The condition for hitting the target is $p > 1$ ($p=1/k$). The stability boundaries for guidance of the missile in the final stage are calculated from the turning rate of the path, while velocity and acceleration are determined from the control-flap declination. The results are plotted in a diagram from which the effect of the control-flap inertia can be determined. Since the pursuit courses are particular cases of the proportional navigation course with A = 1, it is concluded that the increase of the navigational correction widens the stability boundaries in the guidance of a missile in the final stage of its flight. There are 1 figure and 2 tables.

ASSOCIATION: Kafedra teoreticheskoy mekhaniki, Leningradskoye vyssheye inzhenernoye morskoye uchilishche (Department of Theoretical Mechanics, Leningrad Naval Engineering High School)

Card 2/2

SUBMITTED: January 23, 1961

13,2000

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S/140/62/000/001/004/011
C111/C444

AUTHORS: Kan, V. L., Kelʹzon, A. S.

TITLE: On strict solutions of the equations of proportional navigation

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Matematika, no. 1, 1962, 50-56

TEXT: The differential equations of proportional navigation were integrated by Spitz (Ref. 1: Partial navigation courses for a guided missile attacking a constant velocity target. Naval Research Laboratory, USA 1946) for the navigation constant b = 2.

The authors write these equations in the form

$$\dot{a} = v_s\left[\cos\eta - p\cos(b-1)(\eta-\varepsilon_0)\right] \equiv v_s F(\eta) \qquad (1.6)$$

$$a\dot{\eta} = -v_s\left[\sin\eta + p\sin(b-1)(\eta-\xi_0)\right] \equiv -v_s f(\eta) \qquad (1.7)$$

and integrate them for arbitrary integers b. Here a is the distance of the target A from the object B, η is the inclination angle of $\overrightarrow{BA}$; ψ is the inclination angle of the velocity v of B, where $|v| = \text{const}$;

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On strict solutions of the equations ...

$\gamma = \eta - \Psi$; v_s is the velocity of A, constant with respect to the amount and to the direction (it forms the angle η with $\overline{BA}$); $p = \frac{v}{v_s}$; ε_o is defined by

$$\varepsilon_o(b-1) = b\eta_o - \Psi_o \qquad (1.5)$$

where η_o, Ψ_o are the initial values of the variables. One investigates the case $p > 1$. First of all it is stated that the equation

$$f(\eta) = \sin\eta + p \sin(b-1)(\eta - \varepsilon_o) = 0 \qquad (1.8)$$

has exactly $2(b-1)$ zeros on $0 \leq \eta \leq 2\pi$ points. A zero is called stable if neighbored η converge to it with increasing time. It is proved that to stable zeros there corresponds an approximation ($\ddot{a} < 0$) and to the instabil ones there corresponds a divergence ($\ddot{a} > 0$).

The integration of the system is done by the following scheme. (1.6) is divided by (1.7), after integration of the quotients one obtains

$$\ln\frac{a}{a_0}=\frac{1}{b-1}\ln\frac{p\sin(b-1)(\eta-\varepsilon_0)+\sin\eta}{p\sin(b-1)(\eta_0-\varepsilon_0)+\sin\eta_0}-$$
$$-\frac{b}{b-1}\int_{\eta_0}^{\eta}\frac{\cos\eta\cdot d\eta}{p\sin(b-1)(\eta-\varepsilon_0)+\sin\eta}. \qquad (2.2)$$

The remaining integral is integrated for b = 3 with the substitution

$$\operatorname{tg}\frac{\eta-\varepsilon_0}{2}=z,\quad \operatorname{tg}\frac{\eta_0-\varepsilon_0}{2}=z_0 \qquad (2.4)$$

and for b = 4 with the substitution

$$z=\operatorname{tg}(\eta-\varepsilon_0),\ z_0=\operatorname{tg}(\eta_0-\varepsilon_0). \qquad (2.18)$$

For b = 3 one obtains

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On strict solutions of the equations ...

$$\frac{a}{a_0}=\left[\frac{p\sin 2(\eta-\varepsilon_0)+\sin\eta}{p\sin 2(\eta_0-\varepsilon_0)+\sin\eta_0}\right]^{1/2}\prod_{i=1}^{4}\left|\frac{\operatorname{tg}\frac{\eta-\varepsilon_0}{2}-\operatorname{tg}\frac{\eta_i-\varepsilon_0}{2}}{\operatorname{tg}\frac{\eta_0-\varepsilon_0}{2}-\operatorname{tg}\frac{\eta_i-\varepsilon_0}{2}}\right|^{-3B_i\operatorname{ctg}\varepsilon_0}, \quad (2.11)$$

where

$$B_i=\frac{\cos\eta_i\cdot\sec^2\frac{\eta_i-\varepsilon_0}{2}}{2\left[2p\cos 2(\eta_i-\varepsilon_0)+\cos\eta_i\right]}. \quad (2.12)$$

For arbitrary odd b = 2m+1 one uses again (2.4) as well as the repro-sentation

$$\sin 2m(\eta-\varepsilon_0)\cdot\sec^{4m}\frac{\eta-\varepsilon_0}{2}=Q_{4m-1}\left(\operatorname{tg}\frac{\eta-\varepsilon_0}{5}\right) \quad (2.27)$$

where Q_{4m-1} is a polynomial of (4m-1)-th degree. Then the integral attains the form

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On strict solutions of the equations ...

$$I = \int_{z_0}^{z} \frac{2\left[\cos \varepsilon_0 (1-z^2) - \sin \varepsilon_0 2z\right](1+z^2)^{2m-2}}{pQ_{4m-1}(z)+(1-z^2)(1+z^2)^{2m-1}\sin \varepsilon_0 + 2z(1+z^2)^{2m-1}\cos \varepsilon_0} dz \quad (2.29)$$

and is integrated by aid of decomposition into partial fractions (as in the case of b = 3). If b = 2m + 2, then (2.18) and

$$\frac{\sin n\varphi}{\cos^n \varphi} = Q_n(\operatorname{tg} \varphi) \quad (2.31)$$

is used.
At the end it is stated that the curve is always convex with respect to the straight line which connects object and target.

There are 2 Soviet-bloc and 2 non-Soviet-bloc references. The two references to English language publications read as follows:

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S/140/62/000/001/004/011
C111/C444

On strict solutions of the equations ...

H. Spitz: Partial navigation courses for a guided missile attacking a constant velocity target. Naval Research Laboratory, USA, 1946;
A. Locke: Guidance, New York, 1955.

SUBMITTED: May 4, 1959

Card 6/6

KAN, V.L. (Leningrad); KEL'ZON, A.S. (Leningrad)

Accurate solutions to the equations of proportional navigation. Izv. vys. ucheb. zav.; mat. no.1:50-56 '62. (MIRA 15:1)
(Navigation (Aeronautics))
(Differential equations)

S/277/63/000/004/011/013
A004/A121

AUTHOR: Kel'zon, A.S.

TITLE: Investigating the effect of viscous friction on the oscillations and stability of a rigid rotor rotating in ball-and-socket bearings and elastic bearings

PERIODICAL: Referativnyy zhurnal. Otdel'nyy vypusk. 48. Mashinostroitel'nyye materialy, konstruktsii i raschet detaley mashin, no. 4, 1963, 65, abstract 4.48.382. (Bul. Inst. plitehn. Iaşi, 1961, v. 7, no. 3, - 4, 281 - 286, summaries in English and Rumanian)

TEXT: The author analyzes the problem of viscous damping of rotor oscillations in transition through resonance. The investigation revealed: 1. During the resonance the amplitude of forced oscillations, taking into account the friction forces, does not increase unlimited but takes a final value. 2. At high angular velocities of the shaft, the effect of friction forces on the amplitude of forced oscillations is insignificant at a distance from the resonance. The amplitude limit values (taking and not taking into account the friction forces) are identically equal at an unlimited

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growth of the angular velocity. 3. The damping forces may substantially affect the reduction in amplitude of forced oscillations a) near the resonance, b) at small values of angular velocity, i.e. in the zone preceding the first critical velocity. 4. The presence of dissipation forces disturbes the stability of rotor rotation produced by the application of gyroscope members.

[Abstracter's note: Complete translation.]

BERGER, Ye.G.; KEL'ZON, A.S.

Self-centering and balancing of coaxial rotors. Vest. LGU 18 no.13:119-121 '63. (MIRA 16:9)

(Rotors) (Dynamics)

KEL'ZON, A.S.; PRYADILOV, V.I.

Stability, passage over the critical rotation numbers, and natural vibrations of high-speed spindles. Izv.vys.ucheb.zav.; tekh.tekst.prom. no.2:153-163 '63. (MIRA 16:6)

1. Leningradskoye vyssheye inzhenernoye morskoye uchilishche imeni admirala S.O.Makarova.
(Spindles (Machine tools))

L 16799-63 EPA/EPR/EPF(c)/EWT(m)/BDS AFFTC/ASD/APGC Paa-4/Ps-4/
Pr-4 BW/WW/DJ

ACCESSION NR: AP3006475 S/0145/63/000/004/0058/0079

AUTHOR: Berger, Ye. G. (Candidate of technical sciences, Assistant); Kel'zon, A. S. (Candidate of technical sciences, Docent); Pryadilov, V. I. (Docent); Smirnova, O. Ye. (Engineer); Troitskaya, Z. N. (Engineer); Shpeyzman, R. L. (Engineer)

TITLE: Investigating vibrations of a system of coaxial rotors

SOURCE: IVUZ. Mashinostroyeniye, no. 4, 1963, 58-79

TOPIC TAGS: aircraft turbine, gas turbine, self centering, self aligning, turbine compressor, free turbine, rotor, coaxial rotor, high speed turbine, vibration, elastic bearing, rigid bearing, damped bearing, critical revolution, vibration amplitude, vibration free

ABSTRACT: The object of the investigation was the self-aligning dynamic conditions in aviation gas turbine engines, consisting of a compressor, a compressor turbine, and a free turbine. The system investigated consisted of an aircraft gas turbine engine with an

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ACCESSION NR: AP3006475

8-stage axial compressor flexibly coupled with the turbine and a free turbine. The free turbine was mounted coaxially with the compressor turbine (Fig. 2) but rotated independently. The engine operated in the range of 25,000 to 45,000 rpm. The compressor and turbine used the full range of operational velocities; the free turbine did not exceed 25,000 rpm. The experimental study was made with an 8-stage compressor having a rigid horizontal shaft on two bearings — either or both elastic or rigid. The various relationships derived are presented graphically in Figs. 3-5. It is shown that self-aligning conditions may be achieved by adequate design of the rigid and elastic bearings.\ Self-aligning may occur in coaxial rotors of any type after passing the critical speed. Apart from the system shown in Fig. 6 of the Enclosure, other self-aligning systems exist. It is characteristic of these systems that both bearings situated between the coaxial rotors are rigid and the mounting of the system to the stationary turbine body secures 4 degrees of freedom without counting the rotor revolution. In this category of coaxial rotors, the amplitudes of vibrations increase

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ACCESSION NR: AP3006475

slightly during passage through the critical speed and because of self-alignmnet sharply diminish thereafter, which ensures a wide range of vibration-free operational velocities. Orig. art. has: 43 formulas and 8 figures.

ASSOCIATION: none

SUBMITTED: 00 DATE ACQ: 30Sep63 ENCL: 03

SUB CODE: PR NO REF SOV: 007 OTHER: 001

Card 3/6

BAT', Moisey Iosifovich; DZHANELIDZE, Georgiy Yustinovich; KEL'ZON, Anatoliy Saulovich; MARKUZON, I.A., red.; SHKLYAR, S.Ya., tekhn. red.

[Theoretical mechanics in examples and problems] Teoreticheskaia mekhanika v primerakh i zadachakh. Izd.2., ispr. Moskva, Fizmatgiz. Vol.1.[Statics and kinematics] Statika i kinematika. 1963. 483 p. (MIRA 16:12)
(Statics) (Kinematics)

KEL'ZON, A.S. (Leningrad); TROITSKAYA, Z.V. (Leningrad)

Self-centering and balancing of a high-speed compressor. Izv.AN SSSR.Otd.tekh.nauk.Mekh.i mashinostr. no.3:51-57 My-Je '63. (MIRA 16:8)

(Compressors)

KAN,V.L.;KEL'ZON,A.S. (Leningrad)

"Some new problems of proportional navigation"

report presented at the 2rd All-Union Congress on Theoretical and Applied Mechanics, Moscow, 29 Jan - 5 Feb 64.

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BOOK EXPLOITATION

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Kan, Veniamin Lipmanovich; Kel'zon, Anatoliy Saulovich

Theory of proportional navigation (Teoriya proportsional'noy navigatsii) Leningrad, Izd-vo "Sudostroyeniye", 1965. 423 p. illus., biblio. 1,800 copies printed.

TOPIC TAGS: automatic control theory, navigation system, proportional navigation, trajectory determination, aerospace structure, motion mechanics, motion stability, solid kinematics

PURPOSE AND COVERAGE: This book is a study of the symmetrical motion of the relatively linear axis of a solid body converging with a moving point by means of proportional convergence. The book presents the theory of proportional navigation in its present state based on data of Soviet and foreign science as well as on studies made by the authors. Problems of kinematics, dynamics, stability of motion and of automatic control by proportional convergence are viewed. The book is recommended for engineers and scientists specializing in the field of automatic control of motion. Also it would be useful for students in shipbuilding and aviation institutes as well as for students in mechanical-mathematical and physical-mechanical departments of corresponding universities.

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SUB CODE: ME, NG SUBMITTED: 04Jun65

NO REF SOV: 018 OTHER: 016

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